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INSTITUTE OF GAS TECHNOLOGY

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GAS ABSTRACTS

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1. GAS INDUSTRY

British Gas Status

Horsfall, A. V. SOME TRENDS AND INFLUENCES ON THE DOMESTIC LOAD. Inst. Gas Engrs. (Brit.) Commun. No. 467, (1955) May 26; *Gas World* (Brit.) 141, 1424, 25, 28-30, 32-34 May 28; 1560-62, 64 (1955) June 11.

Competition from planned atomic power and electricity projects in Britain, although unlikely to be too serious in the immediate future, should activate the gas industry to produce more gas at cheaper prices. In spite of improved appliances and increased appliance sales to more customers, statistics show an anomalous drop of 45 million therms in annual gas sales from the 1950-51 to the 1953-54 period. The cause of this considerable drop in annual consumption of gas per consumer is analyzed in some detail. Price of gas, replacement of obsolete appliances with new ones of improved efficiency, new housing load, reduced gas lighting, changed cooking and laundering habits, and new water and space heating practices are factors involved in the question of load building within the gas industry and in competition with other fuels. Improvements in all types of appliances will encourage their sale and once their convenience has been established, the householder will slowly increase their use and will build up the load. Also, future changes recommended by the Air Pollution Committee in establishing "smokeless" zones will make it necessary for the gas industry to broaden gas usage, perhaps by special rates for space heating and whole-house water heating, in order to handle the additional 750 million therms of surplus gas from the carbonization of some further 10 million tons of coal per year. O. P. Brysch

Industry Regulation

Hedrick, J. J. REGULATION VS. PIPE LINE PRODUCTION. *Gas Age*, 115, 40-44, 62-64 (1955) April 21.

A discussion of some of the factors involved in the regulation of natural gas production, including a review of the historical background, by the president of Natural Gas Pipeline Co. of America. R. F. Bukacek

Smith, L. SHOULD PUBLIC UTILITY COMMISSIONERS BE ELECTED OR APPOINTED? PART I. *Public Utilit. Fortn.*, 55, 485-96 ((1955) April 28.

A well balanced presentation of the arguments pro and con and the relative performance of the appointed and elected commissioners.

R. F. Bukacek

MAYORS PRESENT CASE ON NATURAL GAS ISSUE. *Public Utilities Fortn.*, 55, 628-631 (1955) May 26.

Mayor J. S. Clark Jr. of Philadelphia speaking for his own city and authorized to express the opinion of 50 other major cities addressed the House Interstate Commerce Committee hearings and asked for continuance of FPC regulation on well-head price of natural gas.

W. G. Bair

Operations Research

Goland, M. and Koenigsberg, E. OPERATIONS RESEARCH: SCIENTIFIC APPROACH TO MANAGEMENT. *Chem. Week*, 76, 42-66 (1955) May 21.

The new management advisory service known as Operations Research is explained, primarily for operating executives of chemical processing plants. Aimed at maximizing or optimizing effectiveness of a company's overall operation, this technique is scientifically based upon mathematical treatment of immediate operating results. Once the causes which correspond to these effects (results) are expressed as a true mathematical model of the operation, this may be used to predict alternate, perhaps improved, courses of action. Linear programming, queuing theory, Monte Carlo method, statistics, symbolic logic, and game theory are among the tools used to formulate the model for integrating various operations in marketing, production, advertising, maintenance, shipping, communications, inventory, research, warehousing and administration. This does not replace the executive but assists him in making decisions. An example, list of consultants and discussion of potentialities of this technique are included.

O. P. Brysch

2. APPLIANCES

Adjustment Service

Kraemer, P. W. SERVICE ANALYSIS—MODERN STYLE. *Am. Gas Assoc. Monthly*, 37, 31-2 (1955) April.

IBM machines are being used to aid in analyzing causes for service calls. Cards which require only two to three checks to describe nearly any repair or adjustment are supplied to the service men. Service orders can be recorded daily and tabulated at short intervals of a few weeks to keep current and accurate records of the nature of service calls. E. F. Searight

Air Conditioning

Hutchinson, S. W. WATER, AIR, AND ENERGY. *Air Cond., Heating and Ventilating*, 52, 90-95 (1955) April.

Detailed qualitative analysis is made of the temperature, mass and heat transfer relationships occurring in the use of controlled-temperature wetted surfaces for treating air. Seven critical loading conditions are analyzed with psychrometric charts. R. T. Ellington

Schwarz, G. L. EVAPORATIVE COOLING IN HUMID AREAS. *Air Cond., Heating and Ventilating*, 52, 93-94 (1955) May.

It is demonstrated that evaporative cooling can be used satisfactorily in many areas which have generally been considered unsatisfactory for this method. Applications to laundries and forge furnaces are discussed. E. F. Searight

AMANA AIR CONDITIONER. *Appliance Manuf.*, 3, 34-41 (1955) May.

A new room air conditioner has been designed by Amana Refrigeration, Inc. It claims the following features: 1) maximum cooling capacity by use of large condensers and evaporators and a "sub-cooler"; 2) a unique, drip-free system of moisture removal; 3) electrical systems built so units can be installed on standard electrical circuits, according to terms of the new National Electrical Code; 4) improved power factors which make possible lower current consumption; 5) thermostats which automatically shut off unit when desired temperature is reached; 6) easily-removed viscous-coated fiberglass filters; 7) a heating unit; 8) fresh air ventilation with or without cooling; 9) stale air exhaust; 10) fingertip-controlled air deflector; 11) hermetically sealed refrigeration system engineered for vibrationless operation; and 12) new adapter kit which simplifies job of washing windows in which the unit is installed. E. F. Searight

Appliance Standards

COMMITTEE ACTS ON 14 STANDARDS. *Amer. Gas Assoc. Monthly*, 37, 11, 12, 53 (1955) May.

Revisions and additions to 14 current American Standards for gas appliances and accessories have been developed by the ASA sectional committee. The new requirements apply to domestic gas ranges, incinerators, water heaters, room heaters, boilers, furnaces, floor furnaces, vented recessed heaters, unit heaters, duct furnaces, deep fat fryers, gas conversion burners for domestic gas ranges, domestic appliance pressure regulators and metal connectors for gas appliances. They will become effective January 1, 1956. E. F. Searight

Appliance Venting

Hampel, T. E. and Stone, R. L. LITERATURE REVIEW AND DESIGN STUDIES OF GAS APPLIANCE VENTING SYSTEMS. Am. Gas Assoc. Labor. Research Bull. 68, Project DA-3-HA, ($2.50) Cleveland (1955) April.

An evaluation of pertinent existing information on the venting of gas appliances is presented. It is intended to provide a basis for subsequent studies of the problem during the current American Gas Association Venting Research Program. Historically, gas appliance vent system design has been based on empirical, "rule-of-thumb" methods. While this procedure has been satisfactory to some degree, as is evident when the multitude of successful vent installations is considered, there has been a long felt need for more precise design methods. Two such methods are presented here with a discussion of their areas of applicability and the solution of a sample problem by means of each. The necessity for further research into various facets of the venting problem is discussed, and those methods of investigation having the highest probability of success, in the judgment of the authors, are indicated. Authors' Abstract

Burners

Smoot, T. H. (assigned to The Lennox Furnace Co.) SINGLE PORT GAS BURNER CONSTRUCTION. U.S. 2,707,516 (1955) May 3.

Fuel Controls

Lamar, C. C. (assigned to Harper-Wyman Co.) GAS VALVE. U. S. 2,707,971 (1955) May 10.

Rochette, R. E. GAS DELIVERY REGULATOR. U. S. 2,699,174 (1955) January 11.

Gas vs. Electricity Costs

NEW REPORT PROVES GAS BEST BUY. *Amer. Gas Assoc. Monthly*, 37, 13, 14, 52, 53 (1955) May.

One of the most comprehensive reports on the subject of equipment cost comparisons has just been released by the American Gas Association. This report, titled "Comparative Total Costs of Gas and Electricity for Cooking and Water Heating in Residences", is the result of a study sponsored by the A.G.A. Committee on Comparison of Competitive Services. This new study provides the gas industry with the additional ammunition necessary in presenting a complete sales story. The report gives detailed information on all the phases of cost involved in owning and operating gas and electric domestic ranges and water heaters.

Author's Abstract

House Heating

Garner, P. INSTALLATION PLANNING. *Gas Heat*, 6, 29-31, 84 (1955) April.

The company has made radiant hot-water heating competitive with warm air through careful installation planning. All panels are carefully designed, and are prefabricated at the plant so that they are ready for installation at the job site. This provides a much neater job, and also effects a considerable savings in labor.

E. F. Searight

Hastings, G. T. IMPROVEMENT CONTINUES IN HOT-WATER HEATING SYSTEMS. *Gas Heat*, 6, 32-34, 82 (1955) April.

The transition from predominantly steam heating to hot water heating in the early part of the century is discussed. Evolution of hot water systems from simple open thermal syphon systems to modern closed forced circulation systems is described. E. F. Searight

Serif, M. HERE'S HOW TO SELL HEATING KEY TO NEW LOAD GROWTH. *LP-Gas*, 15, 45-48 (1955) May.

A hard hitting sales aid directed toward the "house heating" LP-Gas salesman.

J. G. Chalcraft

Humidity Control

Kayse, J. R. HIGH TEMPERATURE PSYCHROMETRIC CHART FOR HUMID AIR. *Air Cond., Heating and Ventilating*, 52, 86-90 (1955) May.

A psychrometric chart is provided which greatly simplifies calculations in the design of systems for handling humid air at temperatures to 1500° F. E. F. Searight

Ross, W. L. and McLaughlin, E. R. AN ANALYSIS METHOD FOR PREDICTING BEHAVIOR OF SOLID ADSORBENTS IN SOLID SORPTION DEHUMIDIFIERS. *Heating, Piping Aircond.*, 27, 169-73 (1955) May.

An empirical method is presented for predicting characteristics of an adsorbent under typical commercial operating conditions. This method is evaluated by a series of designed experimental tests and applied to typical problems. The method is said to be of general use. Limitations are discussed. J. F. Reed

Ignition

Kik, A. J. GAS BURNER AND PILOT MEANS THEREFOR. U. S. 2,709,486 (1955) May 31.

Ray, W. A. (assigned to General Controls Co.) COMBINED GAS AND OIL BURNER CONTROL SYSTEM. U. S. 2,705,045 (1955) March 29.

Ray, W. A. (assigned to General Controls Co.) FUEL CONTROL MEANS. U. S. 2,707,518 (1955) May 3.

Sparks, H. A. (assigned to John W. Henry) TRIGGER OPERATED GAS IGNITER. U. S. 2,709,354 (1955) May 31.

Strobel, C. K. (assigned to Robertshaw-Fulton Controls Co.) IGNITION AND AUTOMATIC PILOT CONTROLS FOR FUEL BURNERS. U. S. 2,707,517 (1955) May 3.

Strobel, C. K. (assigned to Robertshaw-Fulton Co.) AUTOMATIC PILOT AND IGNITION SYSTEMS FOR FUEL BURNER. U. S. 2,707,-519 (1955) May 3.

Panel Cooling

Irwin, R. R. PANEL COOLING FOR A RESIDENCE. *Heating, Piping and Air Cond.*, 27, 175-177 (1955) May.

Data obtained and presented in part in this paper seem to indicate that panel cooling can be used successfully to provide summer comfort in the residence tested. The study was carried out in a college apartment unit under actual living conditions. One of the unexpected results was the importance of the radiant cooling effect of the wall and ceiling panels which gave the occupants a comfortable feeling when discomfort might have been expected because of high humidity readings. The system was designed and operated as a year-round unit, but this paper deals only with the cooling phase.

Author's Abstract

Pilot Burner Design

Griffiths, J. C. RESEARCH IN PILOT BURNER DESIGN, CONSTRUCTION AND PERFORMANCE: SECOND BULLETIN — THE EFFECT OF PILOT BURNER ASSEMBLY MATERIALS AND GAS COMPOSITION ON PILOT BURNER OUTAGE AT ELEVATED TEMPERATURES. Amer. Gas Assoc. Labs. Research Bulletin 69; Project DGR-5-B ($1.00) Cleveland, Ohio (1955) April 8.

Effects of various materials used in pilot burner assemblies and various fuel gas compositions on the formation of foreign deposits in gasways at elevated temperatures were investigated. Analyses of deposits found in the pilot burner assemblies revealed oxides, sulphides, and carbon as the chief causes of blockage. Aluminum minimized cracking of unsaturated hydrocarbons as well as corrosion. In a more fundamental study, temperatures at which various gases formed deposits on several materials which might be used in pilot assemblies were observed. From results of all of the above studies, substitution of yellow brass tubing for copper tubing was found to be desirable. For metal temperatures lower than 1,000F, aluminum was the most satisfactory material studied. Nickel-free stainless steel is suggested for use at metal temperatures exceeding 1,000 F. Design factors of single port, primary aerated pilot burners, with both single and multiple port arrangements, were also studied. Effective designs of these ports and their arrangement to develop satisfactory millivoltage output of their associated thermal-sensitive elements were determined. Unsaturated hydrocarbons and sulphur in the fuel gas were found to affect the performance of these pilot burners when they were operated at elevated ambient temperatures. Higher millivoltage outputs, reduced effects of ambient temperature, and reduced susceptibility to gas passageway blockage were observed with the single port pilot burners, both with and without primary aeration, than with the multiple port, non-primary aerated pilot burners used in these studies. Well designed multiple port pilots have been developed since this investigation started, however, which give satisfactory service in contemporary appliances. Several low Btu range top pilot burners were constructed and used successfully for a period of one year. One of these has been incorporated in an experimental range top section and has since been adapted to several makes of contemporary domestic gas ranges. Also, several commercially available low Btu automatic pilots were found to be satisfactory and desirable for application to contemporary gas-fired equipment. Author's Abstract

Water Heater Sales

SPECIAL TECHNIQUES FOR THE SALE OF LPG APPLIANCES, WATER HEATERS. *Butane-Propane News*, 17, 74-86 (1955) May.

The water heater rental plan has become quite popular and successful in both the LP-gas and utility gas industries. In a very high percentage of cases, rental leads to eventual purchase of the unit, and the door is then open for sale of other gas appliances. E. F. Searight

3. COMBUSTION AND INDUSTRIAL FURNACES

Air Pollution

McCabe, L. C. ATMOSPHERIC POLLUTION. *Ind. Eng. Chem.*, 47, A99-101 (1955) April.

Papers presented at the 1st International Congress on Air Pollution held in New York March 1 and 2 are reviewed, dealing with recovery of sulfur from H_2S-bearing gases and with removal of SO_2 from flow gas. D. M. Mason

Stern, A. C. AIR POLLUTION CONTROL—ADMINISTRATIVE NEEDS AND PATTERNS. Am. Soc. Mech. Eng. Paper No. 55—APC-15, New York (1955) March 1-2.
Needs of various areas for regulation of air pollution are discussed, using data of the 1954 survey of New York State as an example. Some small communities and rural areas have significant problems, both in sources of pollution and in its control. O. P. Brysch

Baking Oven

White, R. G. UNIQUE OVEN MIXES AS IT BAKES. *Ind. Gas*, 33, 8-9 (1955) May.
An eastern food manufacturer was experiencing difficulty in obtaining an oven for baking cornmeal collets which would 1) tumble the corn products inside the oven during baking. 2) provide a continuous process of baking without the necessity of manual loading and unloading. 3) Maintain uniformity of texture and color, and 4) occupy the limited floor space in the plant. The problem was solved by using a continuous process baking oven in which the corn products make three separate passes over ribbon burners. After each pass products drop to the lower stainless steel mesh conveyor. Each conveyor is set back slightly from the one above. The tumbling action ensures uniform, steady baking. E. F. Searight

Ceramic Kiln Fuel

Smith, A. Q. HOW CERAMICS ARE FIRED FOR GAS HEAT. *Ind. Gas*, 33, 10-11 (1955) May.
A gas-fired kiln with five different temperature zones is used for firing the ceramic used in radiant space heaters produced by J. H. Hubbard and Son, Inc. E. F. Searight

Coffee Roaster Fuel

Helme, W. HOW McLAUGHLIN AND CO. ROASTS "A MAN'S COFFEE". *Ind. Gas*, 33, 12-13 (1955) May.
This country imports three billion pounds of coffee each year, and roasts practically all of it by gas. Chicago's popular Manor House brand requires eight roasters; each charge takes 535 lbs., 17 to 18 minutes, at 400° to 430° F.
Author's Abstract

Cyclone Furnace

Van Loon, W. (assigned to De Directie Staatsmijnen) CYCLONE FURNACE. U. S. 2,707,-444 (1955) May 3.
A cyclone-type furnace for burning pulverized fuels is described. Fuel and air are admitted tangentially at the top of the circular chamber and combustion gases are withdrawn through an axial outlet at the top. Ash is removed as liquid slag at the bottom through a tangential port. E. J. Pyrcioch

Degree-Day Meter

Johnson, M. L. DEGREE DAYS BY INSTRUMENT. *Fueloil and Oil Heat*, 14, 81-84 (1955) May.
Degree days are important to the fuel oil dealer in determining when he should deliver fuel to obtain minimum operating costs, and still avoid any possibility of the customer running out. Degree days have often been computed on the basis of a mean value between daily maximum and minimum temperatures. Alternately daily averages have been used. These methods are inaccurate when daily temperatures go above 65° F. for part of the day. In general, heat will be used when outdoor temperatures drop below 65° F. A method which averages high and low daily temperature would, for example, on a day with a minimum of 60° F. and a maximum of 70° F. indicate zero degree days while in actuality, fuel would be used during that portion of the day when temperatures were below 65° F. A more accurate method would, therefore be one which ignores all temperatures above 65° F. An integrating meter capable of accomplishing this has been designed, and is being used by the author's company, and several other concerns.
E. F. Searight

Flame Research

Leah, A. S., Godrick, J. and Jack, H. R. RADIATION AND CHEMILUMINESCENCE FROM EXPLOSION FLAMES OF CARBON MONOXIDE. *Fuel* (British) 34, 133-152 (1955) April.
The radiation and temperatures of carbon monoxide flames were measured to determine the relative contributions of thermal radiation and chemiluminescence. The flames were observed in the hemispherically closed end of a 7-ft. tube, thus permitting measurements during the ignition and cooling periods. The authors conclude that of the total radiation observed, a negligible part is due to thermal radia-

tion and that in dry, hydrogen-free, CO-air flames the radiation is essentially chemiluminescent. The introduction of water vapor or hydrogen increases the temperature and thermal radiation of the flame and reduces the chemiluminescence. All mixtures used contained a large excess of CO. S. A. Weil

O'Neal, C., Jr. EFFECT OF AMMONIA ADDITION ON LIMITS OF FLAME PROPAGATION FOR ISOOCTANE-AIR MIXTURES AT REDUCED PRESSURES AND ELEVATED TEMPERATURES. National Adv. Comm. Aeron. Techn. Note 3446 (1955) April.

Pressure limits of flame propagation were determined for isooctane, ammonia, and mixtures of the two in air at several temperatures in the range of 60° to 400° C. A hot-wire ignition source was employed and the 2-inch-diameter flame tube was closed at both ends. Two-lobed pressure-limit curves were obtained for all mixtures except ammonia in air. For all mixtures studied, the rich limit rose considerably and the lean limit decreased slightly, resulting in a broadening of the flammable region, when temperature was raised. The minimum pressure limit was decreased by raising the temperature. Addition of ammonia broadened the flammable region considerably up to about an ammonia-air weight ratio of 0.02, but thereafter the region narrowed. Over the range of ammonia-air ratios studied (zero to 0.039), the lean limit increased but very little and was in fair agreement with values predicted from Le Chatelier's mixture rule. On the other hand, rich limit equivalence ratio maximized at an ammonia-air ratio of about 0.02 which is not predicted by Le Chatelier's rule. The lowest value of the minimum pressure was also found at an ammonia-air ratio of about 0.02. Gas-analysis data for ammonia after passage of flame in the ternary mixtures showed all the additive was consumed in lean mixtures and from 48 to 62 percent was used in the rich mixtures. Author's Abstract

Wohl, K. BURNING VELOCITY OF UNCONFINED TURBULENT FLAMES. THEORY OF TURBULENT BURNING VELOCITY. *Ind. Eng. Chem.*, 47, 825-27 (1955) April.

The theories of burning velocity of turbulent flames advanced by Karlovitz and co-workers, and Scurlock and Grover, are discussed as to the assumptions involved. A modification is presented to permit a more rigorous integration of the mathematical expression of Scurlock and Grover. S. A. Weil

Wohl, K. and Shore, L. BURNING VELOCITY OF UNCONFINED TURBULENT FLAMES. EXPERIMENTS WITH BUTANE-AIR AND METHANE-AIR FLAMES. *Ind. Eng. Chem.*, 47, 828-34 (1955) April.

The above theories are applied qualitatively to measurements made of the burning velocities of turbulent butane-air and methane-air flames. The burning velocities were determined from the total area of maximum luminosity. An experimental analysis of the flame composition indicated that this region corresponded to that at which the oxygen concentration of the primary combustible mixture had dropped to 50%. The burning velocities were determined as functions of equivalence ratio, turbulence, velocity in burner tube, and tube diameter. S. A. Weil

Flue Gas Scrubbing

Newall, H. E. THE AMMONIA PROCESS FOR THE REMOVAL OF SULFUR DIOXIDE FROM FLUE GAS. Amer. Soc. Mech. Eng., Paper No. 55 — APC-3, New York (1955) March 1—2.

The paper contains an account of experimental work in the laboratory, and with a small pilot plant on the Fulham Simon-Carves Ammonia Process for the removal of oxides of sulfur from flue gas, and the recovery of the sulfur in the form of ammonium sulfate and sulfur. The pilot plant scrubbed 25,000 cu ft of flue gas per hr with a concentrated solution containing ammonium sulfate, sulfite, bisulfite, and thiosulfate. Efficiencies of removal of oxides of sulfur of about 80 percent were obtained. In conjunction with the pilot-plant work, determinations were made of the partial pressures of sulfur dioxide and ammonia in equilibrium with solutions containing ammonium sulfite, bisulfite, sulfate, and thiosulfate, and with the scrubber liquors. The concentrations of sulfur dioxide and ammonia in the washed gas, when operating with various depths of grid packing in the scrubber, were correlated with the concentrations in equilibrium with the scrubber liquors. Two-stage scrubbing also was carried out using a concen-

trated solution of ammonium salts in stage one and a dilute solution of ammonium salts in the second stage. Efficiencies of removal of oxides of sulfur of 95 per cent with little loss of ammonia in the washed gas were achieved.

Author's Abstract

Rees, R. L. THE REMOVAL OF SULFUR DIOXIDE FROM POWER-PLANT STOCK GASES. Am. Soc. Mech. Eng. Paper No. 55-APC-2, New York (1955) March 1-2.

Since the British national Committee on Air Pollution has recommended the removal of sulfur dioxide from flue gases, the British Electricity Authority has been conducting a broad study. Severe removal requirements (90%), wastage of reagents, immense scale of operation, and capital costs have restricted the number of washing processes. Battersea and Bankside stations, using chalk-water scrubbing, have exhausted the absorbing capacity of the Thames River. Cyclic scrubbing (lime or zinc) is too costly. Use of gas (ammoniacal) liquor scrubbing, now in pilot stage, appears somewhat promising.

O. P. Brysch

Gas Turbine

Farnham, P. L. (assigned to Power Jets Res. and Developm. Ltd.) GAS PRODUCER FOR USE WITH A TURBINE POWER PLANT. U. S. 2,706,150 (1955) April 12.

The patent describes a combination pressure gas producer-gas turbine power plant which operates under conditions of deficient air in the producer to generate a fuel gas, followed by heat exchange with incoming air and combustion of the fuel gas in a second chamber directly connected with the gas turbine. Advantages of rapid startup and shutdown are claimed.

C. G. von Fredersdorff

Industrial Heating

Abram, J. C. METAL MELTING OPERATIONS OFFER THE LPG SELLER LARGE SALES POTENTIAL: PART II. *Butane-Propane News*, 17, 46-49 (1955) April.

Foundry operations involved in making various types of castings, and the electrical competition in this field are discussed. Other metal melting operations in which LP-gas may handle at least part of the load are in reverberatory furnaces and in starting cupolas. Linotype melting and heating of plumber's pots represent smaller scale applications.

E. F. Searight

Dickinson, F. and Johnson, F. J. SOME APPLICATIONS OF GAS IN INDUSTRY . . . LADLE HEATING IN THE STEEL INDUSTRY-PIPE BENDING. *Ind. Gas* (British) 18, 208, 210-212 (1955) April.

The use of gas in industry is discussed, based on a paper presented to the Institution of Gas Engineers, February 17, 1955. Steel-ladle heating, and pipe bending operations are cited especially.

J. G. Chalcraft

4. CARBONIZATION AND GASIFICATION

Carbonization

Jones, W. I. NEW PATHS IN SMOKELESS FUEL PRODUCTION. *Chem. Process Eng.*, 36, 147-51 (1955) April.

A new method of producing smokeless fuels and metallurgical coke, using a wider range of low-rank coals has been brought to pilot-plant stage at Stoke Orchard Research Establishment of the British National Coal Board. The feed coal is oxidized by fluid-bed technique similar to that in conventional catalytic oil cracking. The product from the fluid carbonization chamber is briquetted at elevated temperatures (about 500° C.) using a mixture of pitch and fusible coal as binder. These briquettes are subjected to high-temperature carbonization in a second carbonizing reactor using hot sand as the heating medium. Very high by-product yields are reported.

K. C. Channabasappa

Coal Chemicals

Sansam, W. and Gigiel, J. RECENT DEVELOPMENTS IN BY-PRODUCT RECOVERY PLANT. *Gas World* (British), 141 (Coking Sect.), 91-100 (1955) May 7.

Processes are suggested for application in the British coking and gas industry to increase the products and profits recoverable from coal. Detailed discussion of principles, yields and flow-sheets are given for 1) recovery of H_2S by short-contact scrubbing with weak ammonia liquor; 2) recovery of HCN by vacuum carbonate and ammonia scrubbing, 3) recovery of

pyridines (from saturator liquors and from crude benzole,) and 4) pressure hydrogenation refining of benzole (B.A.S.F.-Scholven process.)

O. P. Brysch

Coal Research

Berkowitz, N. PHYSICOCHEMICAL STUDIES ON ALBERTA COALS. I. SURFACE AREA MEASUREMENTS. *Can. J. Techn.*, 33, 169-181 (1955) May.

Surface areas measured by heat-of-wetting technique on some Alberta coals are reported. A catenary—curve relation between surface areas and coal rank is noted. Surface areas vary from about 15 to 300 sq. m. per gm., with maximum values being reached among medium-volatile bituminous coals containing between 85 and 90% carbon. Some degree of relationship between the moisture content of coals and their surface areas is observed. Data on effect of compression and of mild oxidation on surface area are included.

K. C. Channabasappa

Brown, J. K. INFRARED STUDIES OF CARBONISED COALS. *J. Chem. Soc.* (British) 752-757 (March) 1955.

Infrared studies with a weakly caking and a strongly coking coal are presented. The results indicate that coals undergo marked modifications both in physical and chemical structure in the temperature range of 400-550° C. Aliphatic material is removed due to the formation of C-C cross-links between the aromatic systems; hydrogen-bonded phenolic OH groups are also eliminated. The caking coal is found to differ from the coking coal in having higher concentrations of hydroxylic material.

K. C. Channabasappa

Gillet, A. DIE ENTWICKLUNG DER HUMINE AUS VERHOLZTER MATERIE VON DER ZELLULOSE ZUM ANTHRAZIT. (THE DEVELOPMENT OF HUMINS FROM LIGNIFIED MATERIAL FROM CELLULOSE TO ANTHRACITE.) *Brennstoff-Chemie*, 36, 103-20 (1955) April 12.

The author summarizes his theory of the chemical structure of the whole range of solid natural carbonaceous fuels. He explains the progressive changes in elementary composition of the natural fuels, shown by the triangular C-H-O diagram, from the basis of simple organic reactions, ring structures and polymerization. He postulates an "octophenyl" ring structure, corresponding to a skeleton nuclear composition of $(C_{29}H_{22}O_7)_2$ which splits to yield a C26 fragment occurring in bituminous coals and in their solvolysis and pyrolysis products. Compositions and course of coalification are illustrated by 31 diagrams and 28 literature references (chiefly G's.) are cited.

O. P. Brysch

Storch, H. H. THE MELCHETT LECTURE FOR 1954: PROBLEMS IN THE CHEMISTRY AND CHEMICAL UTILIZATION OF COAL". *J. Inst. Fuel* (British), 28, 154-63 (1955) April.

Various approaches to the explanation of the chemistry of coal are reviewed and some work of the Synthetic Liquid Fuels Branch (U.S. Bureau of Mines) is discussed. Recent infrared investigations show that carbohydrates containing a carbonyl group (cellulose, sucrose) upon charring with hydrogenation yield a product with a structure resembling bituminous coal. Agreement has been found on the position and intensities of the important infrared bands assigned to known structures. Differences between coal ranks are shown by fading of the 3.00 mu OH and 8 mu oxygenated aromatics bands and intensification of the longer-mu nuclear bands in the higher ranks. Recent work on relation of chemical structure (H content) to density shows need of a modification of the linearity postulated by Franklin, and also that lack of functional relationship exists. With decreasing rank the coal structure becomes more penetrable by less polar molecules. This evidence shows a minimum density at about 84 percent carbon, at which composition van Krevelen's "rings per carbon atom" of 0.24 also is at a minimum, because it is based directly on density. Van Krevelen's "refractometric increment per carbon atom" permits the calculation of the number and area of aromatic rings per refracting unit from the measured refractive index, which is in agreement with structural estimates based on X-ray diffraction data on coals. Platelets of polynuclear aromatic type, increasing in diameter (7 to 16 A) and in number of stacked layers with increase in coal rank, form the coal crystallite. Surface area measurements by adsorption of N_2 and CH_4 at

0° to 50° C by Zwieterung were found to agree in order of magnitude with those obtained by methanol adsorption; also macropore volume by Hg and total pore volume by He indicate a similar surface area of micropores, namely, about 100 sq. meters per gram. The minima found at coals of 3.5 per cent oxygen (90 percent C) for methanol heat of wetting, methanol monolayer volume, and He-methanol density differences suggests that there is a critical size for poly-cyclic nuclei which affects the surface forces binding the crystallites. These forces also apparently influence the dispersion of coal in solvents. Pertinent references (32) are listed. O. P. Brysch

Gasification

Jones, H. F. FUTURE METHODS OF GAS PRODUCTION. *Gas Times* (British), 82, 337-39, 380 (1955) March 18.

Processes for the gasification of coal, coke and oil are reviewed as potential methods of gas production in the future. The economics of the gas supply in England appears to indicate the probable necessity of increased carbonization of lower rank coals as a source of base-load gas and as a source of domestic coke for consumers in smokeless zones. C. G. von Fredersdorff

Zielke, C. W. and Gorin, E. KINETICS OF CARBON GASIFICATION. *Ind. Eng. Chem.*, 47, 820-25 (1955) April.

Rates of carbon gasification in an atmosphere of hydrogen to produce methane were measured at 1600° and 1700° F. in a laboratory flow reactor operating at 10 to 30 atmospheres. The fuel bed consisted of 65-100 mesh Disco char. The hydrogenation rates increased with pressure and with temperature and decreased with the fraction carbon gasified at 1600° F. Apparent orders at 1700° F. of 1.6 to 1.20 with respect to the total pressure were determined from an empirical correlation. Fitting of the rate data to a Langmuir type equation yielded agreement within 5% of the experimental results at 1700° F. Apparent activation energies of 17 to 50 kcal/g mole were determined from an Arrhenius plot. These activation energies increased with the fraction of carbon gasified. C. G. von Fredersdorff

H_2S Removal

Bähr, J. GASENTSCHWEFELUNG DURCH SELEKTIV-KURZWAESCHE MITTELS AMMONIAKLOESUNGEN UND VERARBEITUNG DES SCHWEFELWASSERSTOFFS AUF SCHWEFEL ODER AMMONSULFAT. (GAS DESULFURIZATION BY SELECTIVE SHORT-CONTACT SCRUBBING WITH AMMONIA SOLUTIONS AND PROCESSING THE HYDROGEN SULFIDE TO SULFUR OR AMMONIUM SULFATE). *Brennstoff-Chemie* (German), 36, 129-42 (1955) May 11.

After a review of the various processes for removal of H_2S and recovery of sulfur, the author discusses in detail the principles and development of simultaneous H_2S-ammonia removal methods in the presence of CO_2. The experience with the Badische Anilin und Soda Febrik method of short-contact scrubbing with ammonia solution for selective removal of H_2S is given. The superiority of the Kittel washer (85% H_2S selectivity) over other types of contactors is shown by results in graphical and tabular form. Applications of this short-contact principle to various systems of desulfurization are diagrammed and discussed.

O. P. Brysch

Hydrocarbon Gasification

Pettyjohn, E. S., and Linden, H. R. (assigned to the Institute of Gas Technology, Chicago) U.S. 2,707,675 (1955) May 3.

A method for producing 1000 to 1100 Btu/SCF, 0.6 specific gravity gases completely substitutable for natural gas is disclosed. The process specified employs thermal cracking of propane, butane or natural gasolines in tube furnaces at temperatures from 1460 to 1540° F., pressures from 3 to 4 atmospheres, and residence times from 3 to 5 seconds, followed by separation of light and heavy aromatics. The gases produced in this manner contain over 60 mole percent methane plus ethane, and carbon laydown is less than 2½ weight percent.

H. R. Linden

Shapleigh, J. H. (assigned to Hercules Powder Co.) PRODUCTION OF DOMESTIC GAS. U. S. 2,707,147 (1955) April 26.

The patent describes a process for producing a variable Btu domestic fuel gas by a combination of thermal and catalytic cracking of fluid hydro-

carbons using steam or other oxidizing gas such as air in both the thermal and catalytic cracking sections. The gas obtained from the catalytic cracking is mixed with either the feed stream to, or the product stream from the thermal cracker. The heating value of the resultant gas can vary from 300 to 1400 Btu. Hydrocarbon fuels for the process vary from refinery oil gas to reduced crude oils. W. G. Bair

Hydrogen Production

Buell, C. K. and Clark, A. (assigned to Phillips Petroleum Co.) MANUFACTURE OF HYDROGEN. U. S. 2,699,986 (1955) January 18.

A two-shell pebble heater and solids-lift is used to produce hydrogen-containing gases from hydrocarbons by the usual catalytic reforming process. Catalyst and process gas are in parallel downflow. The lower vessel acts as a combined reformer and water-gas shift section.
W. G. Bair

Oil Gas

Linden, H. R., Reid, J. M., Bair, W. G. and Pettyjohn, E. S. INITIAL OPERATION OF A FOUR-SHELL CYCLIC REGENERATIVE PRESSURE OIL GAS PILOT UNIT. Am. Gas Assoc. Opertg. Sect. Paper CEP-55-16, New York (1955) May 23-25.

This paper covers the results of the first eleven runs made on the pilot plant for the cyclic pressure gasification and hydrogasification of oil. Initial operation with a distillate fuel oil with and without the use of feed hydrogen, and at 30 psig and atmospheric pressures is presented. The four-shell regenerative high-Btu oil gas set has a nominal make-oil capacity of 50 gallons per hour of heavy fuel, and an operating range from atmospheric pressure to 100 psig. The design also includes the following features: 1. Generators of such size as to provide adequate combustion space and oil gas residence time, for operation with no checkerbrick or with as many as 15 courses of checkerbrick, as test results may indicate. 2. Regenerators which operate only on blast air, blast gas, steam and hydrogen-rich carrier gas, and 3. A tar-quenching system using cooled product tar recirculation to avoid use of the conventional wash box, but with provision for later substitution of the latter if found necessary.
O. P. Brysch

Water Gas

Gorin, E. (assigned to Pittsburgh Consolidation Coal Co.) MANUFACTURE OF WATER GAS. U. S. 2,705,672 (1955) April 5.

Water gas is produced in a fluidized bed type of reactor by reacting steam with coal char in the presence of calcium oxide at temperatures in the range of 1500° to 1750° F. and at pressures of 15 to 50 atmospheres. The calcium oxide absorbs the carbon dioxide produced in the reaction forming calcium carbonate. This absorption of carbon dioxide results in a water gas of higher heating value. The exothermic nature of the calcium oxide-carbon dioxide reaction supplies a portion of the heat requirements for the carbon-steam reaction.
E. J. Pyrcioch

5. NATURAL GAS AND NATURAL GAS CONDENSATES

British Pipe Line

THE NORTH WALES PIPELINE. *Gas J.* (British), 282, 377-80 (1955) May 11; *Gas World* (British) 141, 1318-20, 1330, (1955) May 21.

The Wales Gas Board is constructing a 131-mile pipeline system extending from Maelor gasworks along the North Wales coast to Caernarvon. Modern American pipelining methods and machinery are being used on the 250-psi line. Gas will be provided for 70,000 consumers through 25 gas undertakings, and will be supplied from 1) the new Maelor gasworks, 2) coke oven gas from a blast-furnace plant at Shotton, and 3) reforming of methane drained from Point-of-Ayr Colliery. O. P. Brysch

Carbon Black

Balka, W. H. NEW DRY-FURNACE CARBON-BLACK PROCESS. *Oil Gas J.*, 54, 120-122 (1955) May 9.

The Lynn Furmatic process is primarily a gas-feed process. But excellent results have also been obtained when using oil in conjunction with the gas-feed stock. The Lynn process can properly be described as a dry furnace method. Its reactions tend to very dry products of combustion. Water formation is held at a minimum. Dry operation is further carried out throughout the entire process. Cooling is done with air, and pelletizing also uses the dry method. In the

Lynn process, four distinct reactions take place: (1) in the burners, (2) in the dissociation zone, (3) in the cracking zone, and (4) in the primary cooler. H. A. Dirksen

Compression

Feaster, D. J. and Cammen, M. M. ROTARY VERSUS PISTON AIR COMPRESSORS. Amer. Gas Assoc. Oprtg. Sect. Paper DMC-55-22 (1955) April 12-15.
A comparison of piston and rotary portable air compressors presented by a manufacturer now distributing rotary air compressors. Pictures and cross sectional diagrams of the two types of compressors are included and these are compared as to weight, size, and discharge temperature of 100 psig air. G. G. Wilson

Sampson, E. N. JUST ONE SWITCH TO START AND LOAD MAINLINE COMPRESSORS. *Amer. Gas J.*, 182, 28-31 (1955) April.
A discussion of the single-switch automatic control for mainline compressor stations developed jointly by Northern Natural and Cooper-Bessemer. Four basic control circuits are involved: engine starting, valve positioning, alarm and shut down. R. F. Bukacek

Schramm, L. B. PISTON VERSUS ROTARY AIR COMPRESSORS. Amer. Gas Assoc. DMC Conf. Paper, Cincinnati, (1955) April 12-15.
A comparison of piston and rotary portable air compressors presented by a manufacturer of piston compressors. G. G. Wilson

Dakota Status

Lankford, J. D. NORTH DAKOTA TODAY: A STATUS REPORT. *Oil Gas J.*, 53, 109-12 (1955) April 25.
Gas, oil, and sulfur reserves and production in North Dakota are summarized, and a description is given of the single gas processing plant in the area, in which natural gasoline, LP-Gas, and elemental sulfur are produced. D. M. Mason

Distribution Design

Hough, F. A. RELATING DESIGN OF FACILITIES TO THE REQUIREMENTS OF THE LOCATION. *Gas*, 31, 55-56 (1955) May.
The fifth in a series on the background to the new gas transmission and distribution piping code, section 8 of ASA B 31.1, this article discusses the development of the population density indices for classification of locations for design purposes. R. F. Bukacek

Peters, W. C. A PRACTICAL METHOD OF UTILIZING GAS LOAD DATA IN DISTRIBUTION SYSTEM DESIGN. Amer. Gas Assoc. Oprtg. Sect. Paper DMC-55-18 (1955) April 12-15.
A design method utilizing many visual aids is described. This simplified method involves the use of gas-main capacity curves having as parameters per cent space heating saturation and number of customers per mile, domestic and commercial space heating pegging maps, and a simple area Gas Load Computer. The use of this method to estimate feeder requirements, district loads, and long range reinforcement requirements is illustrated. G. G. Wilson

Drilling

Hendrickson, J. W. USING AIR AND NATURAL GAS TO DRILL BY ROTARY METHOD. *Drilling*, 16, 64, 65, 67, 159 (1955) May.
The technique used by the New York State Natural Gas Corporation to drill wells in the Benzette Field in Pennsylvania with a rotary rig using air and natural gas as the circulating medium is described. A comparison of 9 fluid-drilled wells with thirteen air-drilled wells indicated that the drilling time was halved and bit life was increased by approximately 85% when air was used as the circulating medium. G. G. Wilson

Shaffer, D. U. ROTARY DRILLING WITH GAS UTILIZES FORMATION PRESSURE. *Drilling*, 16, 113-4 (1955) May.

A method of rotary drilling using natural gas at formation pressure as the circulating medium is described. Over 600 wells in the San Juan Basin have been drilled by this method. Primary benefits claimed for this method are faster drilling rates, cleaner formation with better deliverability, and easier testing. Chief hazards are fire and blowouts. Average drilling data are presented. G. G. Wilson

Gas vs. Atomic Energy

Lisk, R. C. GAS IN THE ATOMIC AGE. *Gas Age*, 115, 28, 29, 72 (1955) April 7.
The author predicts that atomic energy will

only displace fuel gas when cheap natural gas supplies have been exhausted. The article discusses the problems of the utility in restoring service after an atomic attack.

W. G. Bair

Gas Conditioning

Kohl, A. L. and Riesenfeld, F. C. RECENT DEVELOPMENTS IN THE CONDITIONING OF NATURAL GAS FOR PIPE LINE TRANSMISSION. Am. Gas Assoc. Oprtg. Sect. Paper GSTS (1955) May 9.

A description of some of the recent developments in gas conditioning technology. Topics discussed include removal of particulate matter and chemical losses, corrosion, steam consumption in gas purification systems. In addition, developments in dehydration and hydrate inhibition are briefly covered. R. F. Bukacek

Holder Design

Garrett, W. R. GASHOLDER DEVELOPMENT AND DESIGN. *Gas J.* (British), 281, 777-81 (1955) March 23.

The factors involved in the design of steel water-seal gasholders are discussed including the thickness of sideplates, design load on some of the key parts, and estimation of maximum stresses. Many of the structural details of such gas-holders are also described.

G. G. Wilson

H_2S Removal

Polderman, L. D., Dillon, C. P., and Steele, A. B. WHY M.E.A. SOLUTION BREAKS DOWN IN GAS-TREATING SERVICE. *Oil Gas J.*, 54, 180-83 (1955) May 16.

This is a preliminary report on a research program conducted at Mellon Institute of Industrial Research on problems associated with ethanolamine use. It was found that MEA can be converted to two degradation products which do not accept acid and thus cause loss of solution capacity. The carbonate salt of one of these compounds contributes somewhat to liquid-phase amine corrosion but is not the sole or major agent responsible for equipment failure. The degradation products are removed in the usual commercial practice by distillation of a side stream of the MEA solution.

D. M. Mason

Load Forecasting

Krick, I. B. A VITAL RELATIONSHIP—WEATHER AND THE GAS REQUIREMENT. *Gas Age*, 115, 37-40 (1955) May 19.

An outline of the types of weather service that would be of value to persons in the gas industry are discussed by an experienced meteorologist. Some gas companies have added meteorological departments to their staffs, while some others employ consulting firms to aid in load forcasting.

E. F. Searight

Measurement

Tirrell, R. W. and Evers, J. P. DESIGN OF GAS METER STATION FLOW MEASURING FACILITIES. *Gas*, 31, 125-8 (1955) May.

A discussion of meter station facilities design with emphasis on the design of multiple meter sets in parallel with provision for increasing or decreasing the number of runs in service.

R. F. Bukacek

Meter Maintenance

Bachmann, G. K. AUTOMATIC METER PROVING DEVICES. *Gas Age*, 115, 42-50 (1955) April 7.

After a brief description of early developments in automatic meter test equipment, three types of automatic proving devices used at the State Meter Shop of the Public Service Electric and Gas Co. of Newark, New Jersey, are discussed. Maintenance and service problems, the economics answers to possible objections, and operating advantages of automatic prover control are also considered. A brief description of the basic electrical elements used in this equipment is also included. G. G. Wilson

Martin, G. H. ASSEMBLY LINE METER REPAIR. *Am. Gas Assoc. Monthly*, 37, 11, 50-1 (1955) April.

The operation of the centralized meter repair shop of the Union Gas Co. of Canada, Ltd., is briefly described. This shop handles approximately 15,000 meters annually by assembly line techniques. G. G. Wilson

Multicomponent Equilibria

Organick, E. I. EQUILIBRIUM RATIO CHARTS FOR HYDROCARBON SYSTEMS. *Oil Gas J.*, 53, 136-138 (1955) April 18.

A brief description is presented of the extensive set of equilibrium vaporization ratio charts soon to be published by the Natural Gasoline Association of America. The "convergence

pressure" concept has been used to relate K ratios for hydrocarbons in multicomponent systems to those in binary systems.

R. T. Ellington

Network Analysis

Sickafoose, R. D. A PUNCHED CARD PROGRAM FOR CALCULATING GAS DISTRIBUTION NETWORK PRESSURES BY THE HARDY CROSS METHOD. Amer. Gas Assoc. Oprtg. Sect. Paper DMC-55-1 (1955) April 12-15.

The preparation of network and load information for the solution of gas distribution network flow problems is briefly outlined. The solution of a 5-loop problem by the Hardy Cross method is illustrated in detail, and the manner in which this method was translated into terms of a punched card program is described. Schematic flow diagrams of the program, program planning charts, and wiring diagrams of the IBM units are included. The IBM equipment used included an 024 Card Punching Machine, and 082 Sorting Machine, an 077 Collator, a 604 Electronic Calculating punch machine, a 514 Reproducing Punch Machine, and a 407 Accounting Machine. The largest problem solved was a network of 400 loops, 1000 mains, and 6 sources. This problem required 73 man hours of preparation, and 40 machine hours for the 8 iterations required to balance it.

G. G. Wilson

Pipe Line Cleaning

Bissey, L. T. GAS PIPE LINE DEPOSITS—CAUSES AND CURES. *Petroleum Eng.*, 27, D28-31 (1955) March.

A summary of the major points of a study on natural gas pipeline deposits. Construction dirt, mill scale, internal corrosion and hydrocarbon and/or weld deposits are cited as primary sources of pipeline dust. A number of suggestions and possible preventative measures are discussed. (See also *Gas Abs.* 11, 89)

R. F. Bukacek

McClure, C. INTERNAL CLEANING OF PIPELINES WITH DETERGENTS. Am. Gas Assoc. Oprtg. Sect. Paper GSTS-55-4 (1955) May 9.

A description of El Paso Natural Gas Co's. experiences with the use of detergents for pipeline cleaning. Included are descriptions of the developments made in the equipment and process used and, in more detail, the present state of the art.

R. F. Bukacek

Pipe Line Connections

Markl, A. R., George, H. H., and Rodabaugh, E. C. PRESSURE-PULSATION TESTS OF BRANCH CONNECTIONS TO LARGE-DIAMETER PIPE. Am. Gas Assoc. Oprtg. Sect. Paper GSTS-55-3 (1955) May 9.

A report of tests made on six types of encirclement reinforced branch connections, unreinforced and saddle reinforced branch connections under conditions of pressure pulsation. Failure appeared to be governed by basic geometry and a scale of performance was established for the various designs tested.

R. F. Bukacek

Pipeline Communications

Hale, D. SEVEN YEARS LATER. *Petroleum Eng.*, 27, D52, 54-56 (1955) April.

Microwave communication has grown from a small beginning seven years ago to a $18,000,000 investment containing 15,505 communication miles in 37 systems. Oil and gas pipelines account for a large majority of the systems. Increasing usage of this communication means is predicted for the future.

W. G. Bair

Pressure Control

Anuskiewicz, M., Jr. METHODS TO PREVENT OVERPRESSURE IN DISTRIBUTION SYSTEMS—A TASK GROUP REPORT. Am. Gas Assoc. Oprtg. Sect. Paper DMC-55-3 (1955) April 12.

A descriptive summary of various methods used to prevent overpressure in distribution systems is presented. Types of equipment described include liquid seals, relief valves, dual regulators, monitor and override regulators, automatic shutoffs, telemetering, and "integrated systems". The text is well illustrated with diagrams and includes a 53-item bibliography.

G. G. Wilson

LaViolette, W. A. REMOTE CONTROL OF REGULATOR STATIONS. Glamser, J. H., Steger, S. J. and Mueller, D. E. REMOTE CONTROL OF REGULATORS. Am. Gas Assoc. Oprtg. Sect. DMC-55-5 (1955) April.

A panel discussion of the remote control of regulators and regulator stations presented in two parts. (I) Remote Control of Regulator

Stations: The operation of various remote control and signalling systems as developed by the Pacific Gas and Electric Company are described and illustrated. The systems discussed include remote control of regulators, remote operation of a compressor, indication of valve positions, and remote throttling of valves. (II) Remote Control of Regulators: The remote control of gas flow from underground storage by the Oklahoma Natural Gas Co., a remote control system for the low-pressure district regulators of the gas division of the Memphis Light, Gas and Water Co., and the remote control of a Laclede Gas Co. high-pressure regulator station handling widely varying load conditions are briefly described and illustrated.

G. G. Wilson

Well Corrosion

De Witte, L. and Radd, F. J. CORROSION OF OIL WELL CASING BY EARTH CURRENTS. T. P. 4033. *J. Petroleum Techn.*, 7, 66-72 (1955) April.

A presentation of the thesis that electrical currents observed in well casing are mainly due to electrochemical potentials of the type in evidence on spontaneous potential curves of electrical logs. The presentation includes a discussion of the general nature of spontaneous potentials, a qualitative illustration of the relation between spontaneous potentials and casing currents, and a comparison of a measured current profile with calculated results obtained from theoretically derived equations relating casing current distribution to electric log SP curves.

G. G. Wilson

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Australian Fuels

Nottes, E. G. and Mapstone, G. E. WHAT ARE PROSPECTS IN AUSTRALIA? *Petroleum Eng.*, 27, C26, 29-30, 32-33, 35, 37 (1955) April.

Australia must import most of its crude oil requirements, as it is lacking in large oil producing fields. However it does have large reserves of black and brown coal located near to the industrial and population centers on the east of the continent, which could with certain processes be used for synthetic fuel production. As these coals can be mined cheaply, fuel synthesis should eventually be competitive with imported petroleum products. High pressure hydrogenation and pressure gasification with steam and oxygen of the coal followed by Fischer-Tropsch synthesis are processes to be considered. Although high pressure hydrogenation on a large scale is technically feasible the required capital investments are very large. Lower capital investments are required for pressure gasification of coal. A gasification plant for town gas production combined with the Fischer-Tropsch process is presently being erected.

E. J. Pyrcioch

Fischer-Tropsch

Hall, C. C., and Taylor, A. H. FLUIDISED PILOT PLANT FOR THE FISCHER-TROPSCH SYNTHESIS. *Chem. and Process Eng.* (British), 36, 92-94 (1955) March; *J. Inst. Petroleum* (British) 41, 101-24, (1955) April.

Results obtained in two initial runs in a fluidized catalyst hydrocarbon synthesis pilot plant are presented and discussed. The 8-in diam plant was designed for fuel gas rates up to 2.5 MCF per hour, operating pressure of 20 to 50 atm. and a temperature up to 644° F. An alkali-impregnated mill-scale catalyst was employed in the runs of 14 and 30 days duration. In both runs gas conversions were lower than expected from previous studies with a 1-in diam reactor, with a rapid reduction in catalyst activity experience at the end of the second run. The cause of the sudden reduction in activity has not been clearly established but is presumed to be caused by deposition of a layer of a complex carbonaceous material on the catalyst surface. Under the same operating conditions significantly better results were obtained in the 1-in diam reactor than in the 8-in diam reactor. It is concluded that it would be unwise to design a full-scale reactor by simply increasing the dimensions of the pilot-plant reactor.

E. J. Pyrcioch

Fluid Coking

Barr, F. T. and Jahnig, C. E. FLUID COKING AND FLUID COKE. *Chem. Eng. Progress*, 51, 167-173 (1955) April.

An improved process of fluid coking, operating in the temperature range of 950-1200° F. for upgrading heavy residual oils to lighter products is described. This process is reported to yield substantial amounts of gas oil, naphtha and a new and unusual coke. The coke consists

of rounded particles of relatively narrow size range, hard and resistant to attrition, which pours and flows easily, contains 1.5-20% hydrogen, 1.0-5.0% V. M. and 90% carbon besides sulfur and ash. K. C. Channabasappa

Hydroforming Catalysts

Hettinger, W. P., Jr., Keith, C. D., Gring, J. L., and Teter, J. W. HYDRO-FORMING REACTIONS: EFFECT OF CERTAIN CATALYST PROPERTIES AND POISONS. *Ind. Eng. Chem.*, 47, 719-30 (1955) April.

Methylcyclohexane, n-heptane, an enriched dimethylcyclopentane feed stock, as well as several other pure hydrocarbons, have been used to study the pertinent Hydroforming reactions which occur over RD-150 platinum on alumina catalyst. The rates of dehydrogenation, isomerization, dehydrocyclization, and hydrocracking have been investigated over a range of temperatures and pressures of interest commercially. Data are presented to show the effect of catalyst particle size and platinum concentration, as well as the specific effects of such temporary poisons as water, sulfur, and nitrogen on Hydroforming reactions. Studies of the effect of arsenic demonstrate the catalyst's considerable tolerance for this potential poison.

Authors' Abstract

Synthetic Fuels, 1954

SYNTHETIC LIQUID FUELS: ANNUAL REPORT OF THE SECRETARY OF THE INTERIOR FOR 1954: PART I. OIL FROM COAL: U. S. Bur. Mines Rept. Inv. 5118; Part II OIL FROM OIL SHALE. U. S. Bur. Mines Rept. Inv. 5119 (1955) March.

These reports, on the tenth year of research under the Synthetic Liquid Fuels Act, cover the Bureau of Mines work at 3 laboratories and two experiment stations. The Bruceton (Pa) laboratory continued its research on Fischer-Tropsch catalysts, especially steel wool and turnings, as well as pilot work on slurry catalysts, carbon dioxide removal and one-step coal hydrogenation. Studies of coal structure and analysis of products continued. The Morgantown Experiment Station continued to study the atmospheric and high-pressure gasification of coal. Gas purification (dust, CO_2 and H_2S removal) were investigated in pilot filters and turbomixers. Coal suspensions, kinetics of steam-carbon reaction and chelate oxygen removal also were studied. The Gorgas (Ala) underground gasification project was reactivated by a study of hydraulic fracturing of the coal bed, which though not complete, shows a great increase in bed permeability. At the Rifle (Colo) oil shale station, shale mining, core drilling sampling and cost studies continued. Exploratory runs were made in the revised 6 ton/day and the new 25 ton and 150-300 ton/day gas combustion retorts, to establish temperature control and feeding rate. In refining, a visbreaking cracking run was made and the product-oil fed raw and as a gas-oil fraction to a recycle cracking run, to complete the program on thermal and chemical treating. Analytical and economic evaluation studies were made. The Laramie (Wyo.) laboratory reported assay logs of many shales, and conducted research on analytical methods retorting temperature, hydrogenation refining to remove S, N and A, naphtha composition, and high temperature oils

O. P. Brysch

Petroleum Demand, 1965

Lyman, A. L. WHAT WE'LL BE MAKING IN 10 YEARS. *Petroleum Ref.*, 34, 139-44 (1955) May.

This analysis of the product demand on U.S. refinery in 1965 estimates a further reduction of residual fuel yields to 13% of the total petroleum demand, a slow rise of distillate fuel demand to 20% of the total fuel demand a substantial increase in catalytic cracking, and particularly catalytic refining capacity, accompanied by an increase in octane rating for motor gasolines to 100 and higher. In spite of the decrease in the percentage of residual fuel produced, it is estimated that 1½ million barrels/day of bunker "C" oil will be available in 1965 from U.S. refineries because of an increase of total refinery run to 11 million barrels/day. The total residual oil demand for 1965 is estimated at 2 million barrels/day. The demand for kerosene is expected to level out at 350,000 barrels/day, but the yield will drop to less than 4%. The potential use of kerosene for commercial jet transports is not expected to upset this picture. Also aromatics and aliphatics will be required for petrochemical use in 1965, representing a total of approximately 150,000 barrels/day or 1.3% of the total petroleum demand.

H. R. Linden

7. ANALYTICAL METHODS AND TESTS

Acid Mist Method

Gerhard, E. R. and Johnstone, H. F. MICRODETERMINATION OF SULFURIC ACID AEROSOL. *Anal. Chem.*, 27, 702-703 (1955) May.

Aerosol particles are collected by a high velocity impactor on a film impregnated with thymol blue. The resulting color change is measured by a photoelectric colorimeter. The method determines 0.01 to 0.2 gamma of sulfuric acid and detects the presence of any acid aerosol but is not sensitive to acidic gases. Alkaline gases affect the results. D. J. Dennison

Asphalt Fractions

Kleinschmidt, L. R. CHROMATOGRAPHIC METHOD FOR THE FRACTIONATION OF ASPHALT INTO DISTINCTIVE GROUPS OF COMPONENTS. *J. Res. Nat. Bur. Standards*, 54, 163-166 (1955) March.

A chromatographic method for the separation of asphalt into four distinct groups of components is described. The method utilizes fuller's earth as the adsorbent, and n-pentane, methylene chloride, and methyl ethyl ketone as selective solvents. The fractionation of asphalts into components in this manner facilitates the study of the degradation of asphalts in service. Although the method, in general, is not limited by the size of the specimen, it is particularly suited to samples of 3 to 6 grams, in which case it requires from 6 to 8 hours, depending upon the nature of the asphalt, for a complete fractionation. The time required to fractionate the pentane-soluble components is about 3 hours.

Author's Abstract

Carbon Determination

Gabourel, J. D., Baker, M. J. and Koch, C. W. SIMULTANEOUS DETERMINATION OF TOTAL CARBON AND CARBON-14 ACTIVITY COMBUSTION METHOD. *Anal. Chem.*, 27, 795-7 (1955) May.

The tube packing employed in this method eliminates cross contamination due to carbon-14 holdup. The procedure should permit the simultaneous determination of total carbon and carbon-14 activity for any compound that can be analyzed by the conventional Pregl method.

D. J. Dennison

Hussey, A. S., Sorensen, J. H., and DeFord, D. D. AMMONIUM SULFAMATE AS SUBSTITUTE FOR LEAD PEROXIDE IN MICRODETERMINATION OF CARBON AND HYDROGEN. *Anal. Chem.*, 27, 280-81 (1955) February.

The oxides of nitrogen formed in the combustion analysis of nitrogen-containing compounds can be removed effectively by ammonium sulfamate dispersed on silica gel. This reagent, placed between the water absorption tube and the carbon dioxide absorption tube, removes oxides of nitrogen by reducing them to nitrogen and nitrous oxide. The use of this reagent eliminates the need for the lead peroxide section usually placed in the exit end of the combustion tube. The analytical values obtained when ammonium sulfamate is used are not notably more precise or more accurate than when a lead peroxide filling is used. However, the use of a substitute for lead peroxide eliminates the highly erratic values observed periodically when any of the equilibria involving the lead peroxide surface become upset by exposure of the filling to an excess of nitrogen oxides.

Authors' Abstract

Gas Analyzer

Hartmann, H. F. and Clark, P. S. AN IMPROVED GAS ANALYSER. *National Gas Bull.* (Australia), 19, 10-15 (1955) January-February.

Reagents and procedure for accurate volumetric gas analysis selected on the basis of a study of a number of methods proposed in the literature, are described. Reagents selected were aq. KOH for acid gases, acid mercurous sulfate for unsaturates and chromous chloride for O_2, and cuprous chloride followed by cuprous sulfate-beta naphthol for CO, activated silver oxide for H_2, copper oxide-iron oxide at 750-800° C. for paraffins. D. M. Mason

Sulfur Determination

Belcher, R. and Spooner, C. E. SOME NOTES ON THE RAPID METHOD FOR THE SIMULTANEOUS DETERMINATION OF SULFUR AND CHLORINE IN COALS AND COKES. *Fuel* (British) 34, 164-168 (1955) April.

Since the rapid method for the simultaneous determination of sulfur and chlorine was first described, several minor modifications have

been introduced. Some of these have been in use for about twelve years. The present paper describes these modifications, which are concerned with the amount of sample, the rate of oxygen flow, the design of the combustion tube, the removal of carbon dioxide from the absorbing solution, the stability of the indicator and the determination of chlorine.

Authors' Abstract

8. GENERAL AND PHYSICAL CHEMISTRY

Diatomic Gases

Wooley, H. W. EFFECT OF DISSOCIATION ON THERMODYNAMIC PROPERTIES OF PURE DIATOMIC GASES. Nat. Adv. Comm. Technical Note 3270 (1955) April.

Equations are presented for the calculation of the enthalpy and entropy of an equilibrium mixture of a diatomic gas and its atoms. A graphical method for obtaining charts for these thermodynamic properties is described and applied to the gases, hydrogen, oxygen and nitrogen.

S. A. Weil

Diffusion Coefficients

Orlicek, A. F. and Sattler-Dornbacher, H. NOMOGRAMM ZUR BERECHNUNG DER DIFFUSIONSKONSTANTEN VON PARAFFIN-KOHLEN-WASSERSTOFFEN. (NOMOGRAM FOR THE CALCULATION OF DIFFUSION CONSTANTS OF THE PARAFFIN HYDROCARBONS.) *Erdoel und Kohle* (German), 8, 247-49 (1955) April.

A nomograph is presented which permits estimates of gas diffusion coefficients for paraffin hydrocarbons from the Gilliland equation and a correlation of molecular volume of paraffin hydrocarbons with their carbon number. The diffusion coefficient is given in units of square meters per hour. H. R. Linden

Fracture of Solids

Hiorns, F. J. THE RELATION BETWEEN BRITTLE BEHAVIOR AND THE STRENGTH AND STRUCTURE OF MATERIALS. *Brit. Coal Utilis. Research Assoc. Monthly Bull.*, 19, 49-60 (1955) February.

Factors affecting the breakage of solids, particularly those in a brittle state and evidences in favor of microcrack theory of brittle fracture are discussed. It is suggested that the fracture properties of solid materials depend to a great extent on the experimental conditions. This dependence is especially evident for reactive solids normally showing brittle behavior, such as glass, and for solids containing pores, such as coal. K. C. Channabasappa

Silica Properties

Holt, P. F. and King, D. T. THE CHEMISTRY OF SILICA SURFACES. *J. Chem. Soc.* (British) 773-79 (1955) March.

Solubility measurements indicate that an incomplete monolayer normally exists on silica surfaces which is more soluble than the rest of the material. This layer has been identified as silicic acid by following the exchange reaction between a quartz surface and dissolved silicic acid. The layer is removed by sodium hydroxide and re-formed when the silica is equilibrated with a silicic acid solution. Authors' Abstract

9. ORGANIC CHEMISTRY

Ammonia

Caldwell, D. L. A COMPLETE SYNTHETIC FERTILIZER PLANT. *Heat Eng.*, 29, 94-99 (1954) November-December.

The new John Deere synthetic ammonia and urea plant at Pryor, Oklahoma is described. Processes included are the Texaco partial oxidation method of synthesis gas production, Casale ammonia conversion and Pechiney recycle urea synthesis. This plant has daily capacities of 180 tons of ammonia and 260 tons of urea.

J. M. Reid

Ethylene

Geisselbrecht, G. ATHYLEN, EIN KOHLENWERTSTOFF? (ETHYLENE, A COAL CHEMICAL.) *Gas- und Wasserfach* (German), 96, 198-99 (1955) April 1.

Physical properties, sources, methods of purification and typical chemical reactions for ethylene are summarized. C. G. von Fredersdorff

Gas Chemicals

Crockett, L. O. THE NATURAL-GASOLINE PRODUCER'S STAKE IN CHEMICAL MANUFACTURE. *Oil Gas J.*, 53, 162, 165, 166, 169, 172-178 (1955) April 18.

A very comprehensive discussion of the petrochemical market and of petrochemicals which are derived from natural gas, LP-gas and nat-

ural gasoline is presented. These chemicals are classified under raw materials with a description of processing methods and market potentials in each group. Entrance into the petrochemical field by natural gasoline plant operators is proposed, to increase investment return as well as decrease the seasonal fluctuation in demand normally associated with natural gas liquids. J. M. Reid

Reid, J. M., Linden, H. R. and Pettyjohn, E. S. PRODUCTION OF PETROCHEMICALS FROM NATURAL GAS AND NATURAL GAS LIQUIDS. Am. Gas Assoc. Opertg. Sect. Paper CEP-55-17, New York (1955) May 23-25.

Various conversion processes are reviewed and selected operating results are presented for production of acetylene from natural gas liquids by high-temperature cracking in silicon carbide tubes, and the production of ethylene and aromatics by thermal cracking in high-alloy-steel tube furnaces. Conversion of propane and butane to ammonia synthesis gas in high-alloy steel catalytic reforming furnaces at pressures in the order of 100 psig may also be competitive with equivalent processes utilizing natural gas, or with the new partial oxidation process which can use petroleum oils as feed. A. E. Neumann

Oxidation Process

Barusch, M. R., Payne, J. Q., and Neu, J. T. (assigned to California Research Corp.) PROCESS FOR PRODUCING UNSATURATED HYDROCARBONS AND OXYGEN COMPOUNDS OF HYDROCARBONS BY OXIDIZING HYDROCARBON GASES. U. S. 2,706,740 (1955) April 19.

A partial oxidation process is described in which a controlled low temperature flame front is employed to produce unsaturated hydrocarbons and oxygenated compounds from non-aromatic hydrocarbon gases or vapors. Supporting data are included showing significant yields of acetylene. J. M. Reid

Synthetic Rubber

Weber, G. RIVALRY BRIGHTENS RUBBER FUTURE. *Oil Gas J.*, 53, 72-74 (1955) April 11.

Now that 24 of the Government synthetic rubber plants have been sold to private interests, keener competition is expected in the rubber market. The results will be accelerated research to improve both processes and products, and new plant investment. Because of the fixed supply of natural rubber and increasing foreign demand, the domestic consumption of synthetic is expected to nearly double in the next 5 years. Production capacity will probably be able to stay ahead of demand so that a buyers market will exist for some time. J. M. Reid

10. CHEMICAL ENGINEERING

Absorption

Leva, M. and Wem. C. Y. ABSORPTION AND HUMIDIFICATION. *Ind. Eng. Chem.*, 47, 505-7 (1955) March (II).

The past year's publications on gas absorption topics are reviewed. New books by Morris and Jackson, and by Leva are briefed. Many contributions were made on tower operations which included packed towers, plate and wetted-wall towers and packings. In mass transfer studies, film components of the absorption coefficients under various pressures and solutions were reported. Solubility of gases, technical absorption processes, and cooling towers are included. A total of 46 items are cited.

O. P. Brysch

Lynn, S., Straatemeier, J. R. and Kramers, H. ABSORPTION STUDIES IN THE LIGHT OF THE PENETRATION THEORY. I. LONG WETTED-WALL COLUMNS. *Chem. Eng. Science*, 4, 49-57 (1955) April.

The absorption of SO_2 by water and by aqueous solution of HCl, $NaHSO_3$ and NaCl using relatively long wetted-wall columns (12 to 22 cm) with no gas phase resistance has been investigated. The results of the investigation show 1) that in the presence of small concentrations of a surface active material (here Teepol, an alkyl sulphate wetting agent) the rate of absorption is very well predicted by the penetration theory, 2) that the primary function of the wetting agent is to prevent the formation of ripples in a falling film of the heights used and 3) that the hydrolysis reaction of the system SO_2-H_2O is very rapid relative to the contact times involved, so that absorption of SO_2 by water may be considered as physical absorption. The data obtainable with this type of absorber may be used

to calculate a rather reliable value of the product $C^* \sqrt{D}$ in the case of physical absorption. If this product is known, the absorber may be used to study reaction rates in chemical absorption.

Authors' Abstract

Gas Separation

Barton, H. M., Jr. (assigned to Phillips Petroleum Co.) SEPARATION OF GASES BY DIFFUSION. U. S. 2,699,836 (1955) January 18.

Hydrogen is separated from hydrocarbon-processing gas mixtures (carbon-black furnace gases) by a combined thermal diffusion and porous diaphragm diffusion (with sweep gas) process. Gas enters the bottom of a hollow cylindrical diffusion barrier open at both ends which is surrounded with a gas-tight shell coaxially so as to provide an annular space which is swept with steam. Hydrogen because of lower molecular weight, diffuses more rapidly through the barrier than do heavier gases, and when through the barrier is swept away with steam to a condenser, where it is separated, while the heavier gases move upward and leave the top of the inner barrier. Several such units may be used in series to concentrate the desired diffused gas. Also a cooling cylinder may be inserted axially within the inner barrier, to increase the thermal gradient across the barrier.

O. P. Brysch

Sulfur Recovery

Smalley, G. E. and Klohr, J. W. REFINERY SULFUR RECOVERY AIDS AIR POLLUTION CONTROL. Amer. Soc. Mech. Eng. Paper No. 55—APC-12 (1955) March 1-2.

The disposal of hydrogen sulfide released in some present day refining operations poses a problem to refiners. Many have found that easily operated plants which convert the hydrogen sulfide to elemental sulfur provide a practical and profitable means to handle these streams. Not only is the quantity of sulfur compounds emitted to the atmosphere reduced, but also an additional supply of a valuable commodity is produced which is expected to be in excess of 1000 tons per day by the end of 1955. A description of the process and plant operation is given.

Authors' Abstract

Tray Towers

van den Berg, G. J. THE APPLICATION OF TURBOGRID TRAYS IN THE PETROLEUM INDUSTRY. *J. Inst. Petroleum* (British), 41, 45-53 (1955) February.

A report of experience using turbogrid trays. Included are information on the comparative performance of bubble-trays and turbogrid trays.

R. F. Bukacek

11. PROCESS EQUIPMENT AND INSTRUMENTATION

Conveyor

Bannister, H. and Whelan, P. F. THE JACOBY CONVEYOR AS A SOLIDS FEEDER. *Chem. Process Eng.* (British), 36, 115-118 (1955) April.

The Jacoby conveyor, consisting of spiral flights inside a rotating tube, is compared to the conventional screw feeder. Only free-flowing materials can be used. By adjusting the angle of the conveyor considerable variation in flow rate can be achieved.

W. G. Bair

Infrared Analyzers

Lounsbury, I. R. INFRARED ANALYZERS IN AMMONIA PLANTS. *Can. Chem. Processing*, 39, 84-6, 88, 90 (1955) May.

The applications and installation of continuous infrared analysers in an ammonia plant are discussed. The advantages of this type of analyzer over conventional laboratory instruments are listed.

D. V. Kniebes

Oxygen Pump

Bonnaud, H. (assigned to L'Air Liquide) PUMPING PLANT FOR LIQUEFIED GAS. U. S. 2,705,873 (1955) April 12.

The patent refers to a pumping plant for liquefied oxygen which is heat insulated and constructed to minimize oxygen losses during operation.

C. G. von Fredersdorff

Vessel Design

Hunter, J. A. SAVE TIME IN VACUUM VESSEL DESIGN. *Petroleum Ref.*, 34, 100-2 (1955) February.

A direct reading chart has been constructed and is presented in this article for obtaining the thickness of heads and cylindrical or spherical shells of vessels for vacuum service. Considerable time can be saved by using this chart instead of the trial and error method provided for in the ASME Unfired Pressure Vessel Code (1952).

J. M. Reid

Major, C. J. CHARTS FOR PRESSURE VESSEL DESIGN. *Chem. Eng.*, 62, 172-75 (1955) April.

A series of nomographs are presented which can be used to determine working pressures and metal thicknesses for commonly used types of pressure and vacuum vessels. Based on the 1952 ASME Code for Pressure Vessels, these nomographs can be substituted for code formulas for estimating purposes. J. M. Reid

12. MATERIALS OF CONSTRUCTION

Cathodic Protection

Koger, W. C. CATHODIC PROTECTION OF TREATING EQUIPMENT. *Petroleum Eng.*, 27, B92-4 (1955) March.

The use of 50-lb magnesium anodes to protect a 6 ft by 20 ft gun-barrel treater is described. The effects of anode location, anode interference, external resistance and current density on the protective system are tabulated. Tests indicated a minimum current density of 5 ma per sq ft was sufficient for protection. G. G. Wilson

Schwerdtfeger, W. J. and Denison, I. A. GEOMETRIC FACTORS IN ELECTRICAL MEASUREMENTS RELATING TO CORROSION AND ITS PREVENTION. *J. Res. Natl. Bur. Standards*, 54, 61-71 (1955) February.

A theoretical consideration of the "electrical boundary" of a galvanic couple immersed in an aqueous medium presented. The experimental results obtained by making potential measurements about bi-metallic couples, both freely corroding and cathodically protected, having different geometric configurations are presented and compared with theoretical data. The electrical boundary of these couples was experimentally determined and checked against theoretical considerations. The effect on the potential patterns around these model galvanic couples of insulating shields simulating the effect of the ground surface over pipelines was also determined experimentally. The practical application of these experimental results to the positioning of reference electrodes when making pipe-to-soil potential measurements on pipelines is discussed. G. G. Wilson

Coatings

Judah, M. A. HOW 36-INCH PIPE IS PICKLED AND COATED. *Pipe Line Ind.*, 2, 64-5 (1955) May.

A brief description of the cleaning and coating procedures being used to coat the interior of 36" steel pipe with epoxy resin for Transcontinental Gas Pipeline Company. G. G. Wilson

Kilberg, A. C. HOW POLYVINYL CHLORIDE TAPE IS USED IN CORROSION MITIGATION PROGRAMS. *Am. Gas J.*, 182, 14-15 (1955) April.

Surface preparation required and application techniques used to coat pipe with polyvinyl chloride tapes are described. Tape thicknesses required, the effects of oil on the tape and cost considerations are also discussed. G. G. Wilson

Corrosion Prevention

Markle, M. G. PROTECTION OF DISTRIBUTION SYSTEMS. Am. Gas Assoc. Oprtg. Sect. Paper DMC-55-4 (19544) April 12.

A review of the corrosion prevention activities of the Northern Illinois Gas Company including a brief history of their corrosion activities, current practices illustrated with diagrams, and personnel requirements of corrosion department. G. G. Wilson

Parker, M. E. FUNDAMENTALS OF CORROSION SURVEYS. *Petroleum Eng.*, 27, D22-7 (1955) March.

General methods of conducting corrosion surveys on existing coated pipelines, on existing bare pipelines, and on congested systems such as refinery areas are presented. Other types of surveys are mentioned briefly. Survey methods covered include soil resistivity plats, soil potential surveys, and temporary application of cathodic protection. G. G. Wilson

High Temperature Alloys

Levy, A. METALS FOR SHORT TIME SERVICE AT HIGH TEMPERATURES. *Materials and Methods*, 41, 117-32 (1955) April.

The use of rockets and jets has necessitated the development of a group of new metals capable of withstanding high temperatures for relatively short periods. The article gives detailed information in the composition and properties of 10-15 of these materials. W. G. Bair

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Australian Journal of Chemistry

Battelle Technical Review
Bituminous Coal Research
Brennstoff-Chemie
British Coal Utilization Research Association Monthly Bulletin and Quarterly Gazette
Butane-Propane News

California Oil World
Canadian Chemical Processing
Canadian Gas Journal
Canadian Journal of Chemistry
Canadian Journal of Physics
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Chemical Abstracts
Chemical and Engineering News
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Chemical Bulletin
Chemical Engineering
Chemical Engineering Costs Quarterly
Chemical Engineering Progress
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Chemical Week
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Current Chemical Papers (Chem. Soc., London)

Drilling

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Faraday Society. Transactions
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Independent Petroleum Association of America Monthly
Industrial and Engineering Chemistry
Industrial Finishing
Industrial Gas (American)
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Institute of Fuel (British). Journal
Institute of Gas Technology Publications
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National Fire Protection Association Quarterly
National Gas Bulletin of Australia
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Oil and Gas Journal
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